REMARKS/ARGUMENTS

The present application includes claims 1-3 and 5-20. By this response, independent claims 1, 10 and 18 have been amended. The Applicants respectfully submit that no new matter has been added by this amendment

The Office Action rejected claims 1-3 and 5-20 under 35 U.S.C. §103(a) as being anticipated by Jensen et al (US 6,666,579) ("Jensen") in view of Vilsmeier et al (US 6,527,443).

Amended Claims

Independent claims 1, 10, and 18 have been amended to recite, in various forms, that the sequential image by image presentation of the 2D images creates motion of the 2D images through the animation process. Support for these amendments can be found in at least paragraph 0023 of the published application No. US 2005/0169510. No new matter has been added. As opposed to items shown in cited art, the recited static images are continuously set in motion to create a naturally occurring 3D image through moving the frames of the plurality of 2D images creating motion through animation. Such systems and methods are not found in the cited art, as explained below, and, thus, for at least these reasons, claims 1-3, 5-20, should be allowable.

Claim Rejections – 35 U.S.C. § 103

The Office Action rejected claims 1-3 and 5-20 under 35 U.S.C. §103(a) as being anticipated by Jensen et al (US 6,666,579) ("Jensen") in view of Vilsmeier et al (US 6,527,443).

The Office Action alleges that Jensen discloses "automatically displaying on an output device each image in said collected plurality of static images in an image by image manner–to create an animation, wherein said at least one position and orientation of said at least one instrument is projected on each said image." The Office Action then quotes the following passage from Jensen to support that Jensen discloses the above limitation of claim 1: "The display graphics processor 295 accesses the slice data set memory 290 to display the image slices

on the display 250. The display graphics processor 295 also constructs graphical representations (i.e. animation) of the instrument or tool 24 and overlays the instrument graphic with the image slices on the display 250. The display graphics processor 295 may present multiple two-dimensional image slices simultaneously on the display 250 with instrument graphics superimposed upon each image slice. Col 10, lines 25-50."

Applicants respectfully submit that Jensen does not teach, suggest or disclose creating motion through the animation process using a sequential image by image presentation through a series of 2D static images animation and thus creating a naturally occurring 3d image. Office Action claims that constructing a graphical representation of the instrument is animation. Applicants respectfully submit that construction a graphical representation is not animation which is a feature of the claimed technology. Animation is defined "The act, process, or result of importing . . . motion. (American Heritage Dictionary, 3d ed.) Amended independent claim 1 claims "automatically displaying on an output device each image in said collected plurality of static images in a sequential image by image manner to create motion through the animation process, wherein said at least one position and orientation of said at least one instrument is projected on each said image." Jensen does not teach that the images are automatically displayed on an output device each image in said collected plurality of static images in sequential image by image manner to create motion through the animation process as claimed by this technology. The Specification recites that "at least one or more of the embodiments uses natural human ability to perceive 3D information from **animated** 2D data to transfer the position and/or orientation of a surgical instrument to a user." (US 20050169510, para. 0045.) Rather than creating motion through animation as recited in amended claim 1 to create 3-D images, Jensen teaches that "The 3-D patient data set may be constructed in step 325 using any one of several

algorithms known for constructing three-dimensional data volumes based upon exposures obtained from a cone beam source. By way of example, the 3-D patient data set may be constructed at step 325 using any one of several well known techniques, such as forward and/or back projection techniques. The patient slices and 3-D images constructed in step 335 may be created in accordance with any of several known algorithms such as those used in connection with existing CT systems. The 3-D images constructed at step 335 and displayed at step 340 may be created from the 3-D patient data set based upon any one of several known volume rendering techniques, such as ray casting and the like. Several known techniques exist for constructing data sets of patient slices (such as for digital, coronal and axial patient views), segments and 3-D rendered images." (Jensen, col. 12, lns. 27-51). Nowhere does Jensen teach, suggest or disclose that the plurality of static images are displayed in such a manner as to create motion trough animation from static images as claimed in amended claim 1 of the instant application. Jensen does not teach, disclose or suggest the creation of motion through animation using static images. Rather Jensen teaches using "any one of several algorithms known for constructing three-dimensional data volumes based on exposures obtained form the cone beam source.

Nowhere does Jensen disclose that the individual images are displayed in an image by image manner to create motion through animation. Rather, Jensen creates a 3-D image in the image volume processor. Further Jensen discloses that the display graphics processor 295 also constructs graphical representations of the instrument or tool 24 and overlays the instrument graphic with the image slices on the display 250. (Jensen, col. 10, lns. 27-30.) Jensen does not disclose, as the Office Action admits, automatically displaying on an output device each image in said collected plurality of static images in an image by image manner–to create an animation.

Rather Jensen discloses a display graphics processor that displays the images slices on the display.

Further, Vilsmeier does not cure the deficiencies of Jensen. Nowhere does Vilsmeier teach, disclose or suggest animation of 2-D static images. Office Action admits Jensen does not "specifically teach automatically displaying on an output device each image in said collected plurality of static images in an image by image manner to create an animation." Applicant submits that Vilsmeier also fails to specifically teach this admitted shortcoming of Jensen. The Office Action's response that that the Examiner used Vilsmeier reference to teach the instrument being projected to the image wherein "a single display S indicating the positions of the operating instruments is married to the x-ray image. In this arrangement, once the patient 1 has been fixed in place, initially preferably two, three, or four x-ray images are made in various positions of the C-arm 14, and the x-ray image data (including the marker pattern defining the position and three dimensional location (are reference and assigned by means of the reflector adapter 18 on the reference structure 17 in the camera assisted navigation system," (U.S. 6,527,443, col. 4, lns. 57-66.), simply does not teach "automatically displaying on an output device each image in said collected plurality of static images in sequential image by image manner to create motion through the animation process." As admitted by the Office Action, Jensen does not teach animation in an image by image manner to use natural human ability to perceive 3D information from **animated** 2D data to transfer the position and/or orientation of a surgical instrument to a user," (US 20050169510, para. 0045.), nor does Vilsmeier cure this deficiency. Applicants respectfully submit the passage of Vilsmeier quoted by the Office Action does not discloses motion through animation of 2D images to perceive 3D images nor does Vilsmeier as a whole disclose animation of 2D images.

The Office Action copies claim 1 of Vilsmeier and concludes that it would be obvious to one of ordinary skill in the art to automatically display of static images in an image by image manner to create an animation of Vilsmeier in Jensen et al. Applicant respectfully disagrees with the Office Action that automatically displaying on an output device each image in said collected plurality of static images in an image by image manner to create an animation would be obvious through the Vilsmeier patent. Further, the Office Action does not furnish any rationale to support this support this conclusionary statement. Rather, Vilsmeier discloses

"the operating surgeon is able to monitor his navigation by way of a single display output, on which the position of the surgical instruments married to the x-ray image is presented. In this arrangement, for two-dimensional navigation with the aid of the x-ray image it suffices in principle to make a **single x-ray image** at the start of the operation and to reference it in the camera-assisted navigation system via the reference structure, making sure that the patient is subjected to no further movement, and to operate by means of the camera-assisted navigation. This, of course, totally eliminates any radiation exposure of the surgeon's hands. The surgeon now sees the stored x-ray image on the display and simultaneously the position of his instruments with a very high accuracy which is now available from current navigation systems. Since the computer unit and display employed simultaneously processes the data made available by the x-ray image and by the camera-assisted navigation, the hardware requirement is reduced. When, a referencing means, trackable by the navigation system, is likewise applied to the patient, movement of the patient between navigation image and reference image is also permitted. Once **the x-ray image** (reference image) has been made and assigned in the navigation system (navigation image), it is basically possible to again move the x-ray unit or even to remove it from the operating theater altogether since all data needed is namely stored in the computer unit. Accordingly, the integrated solution in accordance with the invention also has the advantage that now more space is available at the operating site.

When two, three, four or more x-ray images have been made in various locations in mapping the reference structure three-dimensionally, three-dimensional data may be made additionally available on the x-ray side, too. In one preferred embodiment, several x-ray images of various, preferably overlapping, portions of the treatment area are made, and compiled into an overall view (landscape view), thus enabling, e.g., not only a single vertebra but also the complete spinal column to be imaged, the image being composed of inter linked single images.

Vilsmeier, col. 2, lns. 2-40 (emphasis added).

As seen above Vilsmeier does not disclose motion of the static 2D images by displaying on an output device each image in said collected plurality of static images in an sequential image by image manner to create motion through the animation process, animation of the images as the Office Action seems to allege. Rather, Vilsmeier discloses simply taking an x-ray image and simultaneously displaying the position of the instruments from the navigation system on the x-ray. Thus, Vilsmeier does not disclose animation.

Thus, neither Jensen, as admitted by the Office Action, nor Vilsmeier disclose the recited feature of automatically displaying on an output device each image in said collected plurality of static images in a sequential image by image manner to create motion through the animation process. Further, Applicants respectfully submit that the combination of Jensen and Vilsmeier would not make the claimed invention obvious to one of ordinary skill in the art at the time of the invention. The Office Action provides no rationale for its conclusionary statement that with the combination of Jensen and Vilsmeier, neither of which disclose the feature of animation, it would be obvious to create an animation to obtain more precise results. As stated in the Application "Previous designs have used static, non-animated data to accomplish transfer in a method that requires substantial learned skill." Applicants submit that animating 2D data so that the human may perceive 3D information of a surgical instrument is not obvious as all previous designs have used static non-animated data to accomplish the task. For at least these reason, Applicants submit that neither Jensen nor Vilsmeier, taken alone or in theoretical combination, teaches or reasonably suggests all the limitations of claim 1. Applicants respectfully submit that currently amended independent claim 1 is in condition for allowance.

Claims 2-3 and 5-9 ultimately depend from claim 1 and should be allowable at least for the reasons stated.

With regard to independent claim 10, the Office Action alleges that "the limitation of claim 10 has been addressed above except the following "automatically repeating said selecting, computing, projecting, and displaying steps to create an animation using a sequential image by image presentation through said series of 2D static images." The Office Action alleges that Jensen teaches this limitation and cites to the following passage from Jensen in support "the image processing computer 16 performs parallel operations to repeat steps 305-340 to improve upon the 3-D patient data set and also upon the patient slices and 3-D images being displayed." Applicants respectfully submit that that the Office Action's quoted passage from Jensen does not support that Jensen discloses animation. Rather this passage in Jensen discloses that while the 3-D image is displayed at step 340, the dashed lines of Fig. 8 indicate only that while steps 325, 335 and 340 are being carried out, the image processing computer 16 performs parallel operations to repeat steps 305-340 to improve upon the 3-D patient date set. And as pointed out above, Jensen discloses that the 3-D data set is constructed using any one of several algorithms. Nowhere does Jensen teach, disclose or suggest animation of 2-D static images.

As presented above, nowhere does Jensen teach, suggest or disclose automatically repeating said selecting, computing, projecting, and displaying steps to create motion through the animation process using a sequential image by image presentation through said series of 2D static images as claimed in amended claim 10 of the instant application. Further, Vilsmeier does not teach, disclose or suggest the creation of an animation. Vilsmeier does not cure the deficiencies of Jensen. Further, the Applicants respectfully submit that the combination of Jensen and Vilsmeier would not make the claimed invention obvious to one of ordinary skill in the art at the time of the invention. As stated in the Application "Previous designs have used static, non-animated data to accomplish transfer in a method that requires substantial learned

skill." Applicants submit that sequentially presenting the 2D images creating motion, the animation of static 2D images so that the human may perceive 3D information of a surgical instrument is not obvious as all previous designs have use static non-animated data to accomplish the task. Thus, for at least this reason, Applicants submit that neither Jensen nor Vilsmeier, taken alone or in theoretical combination, teaches or reasonably suggests all the limitations of claim 10. Applicant respectfully submits that currently amended independent claim 10 is in condition for allowance.

Claims 11-17 ultimately depend from claim 10 and should be allowable at least for the reasons stated.

Regarding independent claim 18, the Office Action alleges simply that independent claim 18 has been addressed. Applicants respectfully point out that, as presented above, neither Jensen nor Vilsmeier teach, disclose or suggest animation of 2-D static images by sequential presentation of the 2D images to create motion through the animation process. Rather, Jensen discloses that 3-D images are constructed using one of several algorithms known for constructing three-dimensional data. Vilsmeier discloses taking an x-ray and display the instrument on the x-ray through the use of navigation systems. Further, the Applicants respectfully submit, and the Office Action provides no rationale, that the combination of Jensen and Vilsmeier would not make the claimed invention obvious to one of ordinary skill in the art at the time of the invention. As stated in the Application "Previous designs have used static, non-animated data to accomplish transfer in a method that requires substantial learned skill." Applicants submit that animating 2D data so that the human may perceive 3D information of a surgical instrument is not obvious as all previous designs have use static non-animated data to accomplish the task. Thus, for at least these reasons, Applicants submit that neither Jensen nor Vilsmeier, taken alone or in

theoretical combination, teaches or reasonably suggests all the limitations of claim 18. Applicant respectfully submits independent claim 18 is in condition for allowance.

Claims 19-20 ultimately depend from claim 18 and should be allowable at least for the reasons stated.

As claims stand amended, Applicants respectfully submit, that Jensen does not teach the claimed features of independent claims 1, 10, and 18. Further, the Applicants respectfully submit that the combination of Jensen and Vilsmeier would not make the claimed invention obvious to one of ordinary skill in the art at the time of the invention.

Claims 2-3, 5-9; 11-17; and 19-20 depend from independent claims 1, 10, and 18, respectively. The Applicants respectfully submit that as claims 1, 10, and 18 should be allowed for at least the reasons discussed above, claims 2-3, 5-9, 11-17, and 19-20 should also be allowed.

CONCLUSION

In view of the above remarks, Applicants respectfully submit that claims 1-3 and 5-20 now pending in the application contain patentably distinct subject matter over all the references of record and are in condition for allowance. Applicants, therefore respectfully request consideration of the pending claims and a finding of their allowability. A notice to this effect is respectfully requested. Please feel free to contact the undersigned should any questions arise with respect to this case that may be addressed by telephone.

The Commissioner is authorized to charge any additional fees or credit overpayment to the Deposit Account of GTC, Account No. 070845.

Respectfully submitted,

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